CLAIM AMENDMENTS

1. (currently amended) A roping detector for a hydrocyclone having a separation chamber with an underflow discharge which under normal operating conditions is conical and impacts upon a splash skirt, comprising:

a vibration sensor mounted on the splash skirt for detecting a change in the discharge indicative of roping.

2. (original) The roping detector of Claim 1, wherein the vibration sensor is an ultrasonic sensor.

3. (original) The roping detector of Claim 2, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.

4. (currently amended) A hydrocyclone with a roping detector, comprising:

a separation chamber with an underflow discharge which under normal operating conditions is conical,

a splash skirt upon which the conical discharge normally

impacts, and

a vibration sensor mounted on the splash skirt for detecting a change in the discharge indicative of roping.

5. (original) The hydrocyclone of Claim 4, wherein the vibration sensor is an ultrasonic sensor.

6. (original) The hydrocyclone of Claim 5, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.

7. (currently amended) A method of detecting roping in a hydrocyclone having a separation chamber with an underflow discharge which under normal operating conditions is conical and impacts upon a splash skirt, comprising the step of:

monitoring vibration of the splash skirt to detect a change in the discharge indicative of roping.

8. (original) The method of Claim 6, wherein the vibration is monitored with an ultrasonic sensor.

9. (original) The method of Claim 8, further including the step of using the ultrasonic sensor to produce an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.

10. (currently amended) A roping detector for a hydrocyclone having a separation chamber with an underflow discharge which under normal operating conditions is conical, comprising:

a splash skirt having a cylindrical side wall upon which the conical discharge impacts, and

an ultrasonic sensor mounted on the side wall for detecting a change in the discharge indicative of roping.

11. (original) The roping detector of Claim 10, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.

12. (original) The roping detector of Claim 10, wherein the ultrasonic sensor is enclosed within a housing on an outer side of the side wall.

13. (original) The roping detector of Claim 12, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.

14. (new) A roping detector for a hydrocyclone having a splash skirt and an apex adapted to produce an underflow discharge with a cone angle impacting on the splash skirt, comprising:

a vibration sensor mounted on the splash skirt and adapted to produce an output signal indicative of a variation of the cone angle of the underflow discharge.

15. (new) The roping detector of Claim 14, wherein the vibration sensor is an ultrasonic sensor.

16. (new) A hydrocyclone, comprising:

a separation chamber including an apex adapted to produce an underflow discharge with a cone angle;

a splash skirt connected to the apex adapted to receive the underflow discharge; and

a vibration sensor mounted on the splash skirt adapted to produce an output signal indicative of a variation of the cone angle of the underflow discharge.

17. (new) The hydrocyclone of Claim 16, wherein the vibration sensor produces an output signal relative to a baseline threshold set to a level corresponding to a magnitude of vibration produced by a normal impact of the underflow discharge on the splash skirt.

18. (new) The hydrocyclone of Claim 17, wherein said normal impact corresponds to a pre-determined cone angle.

19. (new) The hydrocyclone of Claim 18, wherein the vibration sensor is an ultrasonic sensor.

20. (new) A method of detecting roping in an underflow discharge of a hydrocyclone, comprising the steps of:

establishing a baseline threshold indicative of a normal impact of the underflow discharge on a splash skirt of the hydrocyclone, said normal impact corresponding to a pre-determined cone angle of the underflow discharge impacting on the splash skirt; and

producing an output signal relative to the baseline threshold indicative of a variation of the cone angle of the underflow discharge from said pre-determined cone angle.

21. (new) The method of Claim 20, wherein the step of producing an output signal includes measuring a vibration caused by the underflow discharge striking the splash skirt.

22. (new) The method of Claim 23, wherein the vibration is measured with an ultrasonic sensor.